Pattern discrimination in a human subject suffering visual agnosia

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Pattern discrimination in a human subject suffering visual agnosia

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Since suffering a stroke some four years ago, H.J.A. has exhibited lack of visual pattern recognition, and CT scans show areas of neuronal damage localized bilaterally in the posterior cerebral cortex (Humphreys & Riddoch, 1984). His failure to recognize familiar objects, including faces, is particularly marked for line drawings (Humphreys & Riddoch, unpublished). We have measured the time required for detection of a target element which differs in orientation from multiple, identical

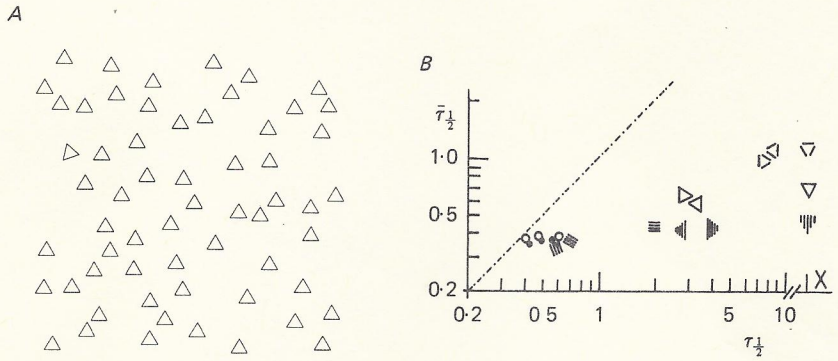

Fig. 1. *A*, typical stimulus pattern, of size 9·5 deg, 7·1 deg; locations of the non-overlapping elements were randomized between presentations. Four possible target orientations were presented 50 times each, in random sequence. Target elements were rotated 0 deg (null target), 30, 60 and 90 deg relative to the background elements. *B*, $\tau_{\frac{1}{2}}$ (seconds) for H.J.A. plotted against $\bar{\tau}_{\frac{1}{2}}$, average values for three normal, naive subjects. The different targets are illustrated on the figure, except for continuous lines and co-linear spots, denoted ● and ○ respectively, which give similar values for all orientations. Targets presented at time X were not detected on 50 % of presentations and the dot–dash line shows the locus $\tau_{\frac{1}{2}}$ equal to $\bar{\tau}_{\frac{1}{2}}$.

background elements (Fig. 1 *A*). Probability for detection of a given target, $P(t)$, was measured as a function of time, t, following its presentation, and $\tau_{\frac{1}{2}}$, the t value for 50 % probability of detection, provides a measure of disrimination performance. H.J.A.'s $\tau_{\frac{1}{2}}$ values for background elements | and ⋮ are essentially normal, but become increasingly abnormal for backgrounds ||| , ⫼ , △ and ▵ (Fig. 1 *B*). The data demonstrate that H.J.A.'s discrimination is disturbed for targets incorporating different line orientation, but not for single lines. Thus those mechanisms responsive to single lines function normally, whereas those which associate line elements into 2-D patterns are selectively disturbed.

REFERENCE

Humphreys, G. W. & Riddoch, M. J. (1984). *Q. Jl expl. Psychol.* **36** A, 385–415.